

Changes in opioid treatment program staffing from 2011 to 2016

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Key Findings

- The number of full-time equivalent staff per 1,000 clients increased for all staff types from 2011 to 2016. The most significant increases were among doctoral-level counselors and pharmacists.
- The share of OTP facilities offering a broader set of ancillary services, a broader set of mental health services and programs for special groups such as adult men, seniors, and criminal justice clients increased over the five-year period.
- The types of medication offered at OTPs evolved from 2011 to 2016. Fewer facilities offered methadone only in 2016, and a higher share offered buprenorphine and injectable naltrexone.
- There was a small increase in the average number of clients served in a facility.

Adequate medical, counseling, and support staff in opioid treatment programs (OTPs) are critical for safe and effective treatment. Federal guidelines require OTPs to provide a broad range of services, including medical, counseling, vocational, educational, and other assessment and treatment services appropriate to meet the needs of the patients they serve. Specifically, federal guidelines state that an OTP must provide each client with a treatment plan and “an adequate number of competent, qualified, and experienced professional clinical staff to implement and supervise the treatment plan, consistent with patient needs.”¹ Federal guidelines thus acknowledge that OTP staffing will vary according to the needs of the patients served. The guidelines also allow facilities to address components of a client’s treatment plan on-site or through formal arrangements with other organizations. For this reason, OTP staffing is also expected to vary depending on the services offered at the program itself rather than through a partnering provider.

Table 1. Number of FTEs per 1,000 clients, 2011 and 2016

Type of staff	Number of FTEs per 1,000 clients		Percentage change
	2011	2016	
Medical staff	10.9	15.2	39.4
Physician	1.6	1.8	12.5
Registered nurse	2.5	4.4	76.0
Licensed practical nurse	5.8	6.1	5.2
Mid-level medical personnel	0.8	1.9	137.5
Pharmacist	0.2	1.0	400.0
Counseling staff	20.0	29.6	48.0
Doctoral degreed counselor	0.3	2.6	766.7
Masters degreed counselor	7.3	9.9	35.6
Other degreed counselor ^a	8.1	9.3	14.8
Associate degreed or non-degreed counselor	4.3	7.8	81.4
Support staff^b	NA	24.5	NA
Pharmacy assistant	NA	1.9	NA
Care manager or patient navigator	NA	3.5	NA
Peer support staff	NA	3.8	NA
Other recovery support worker	NA	3.3	NA
Administrative staff	NA	6.8	NA
Interns, contractors/per diem staff, and intake coordinators	NA	2.4	NA
Other clinical staff	NA	2.8	NA
Number of facilities	938	1,057	12.7
Number of clients	283,490	379,543	33.9

FTE = full-time equivalent

Source: 2011 N-SSATS supplemental OTP questionnaire and 2016 N-SSATS.

Note: Data are limited to OTPs that responded to the staffing items on the surveys and provided only outpatient treatment services.

^a The description of this category on the survey changed between 2011 and 2016. For 2011, the description was “Other degreed counselor (BA, BS),” and in 2016 it was “Bachelors degreed counselor (BA, BS).”

^b Data on support staff were not collected in 2011.

Despite the importance of adequate staffing, limited information is available about the staffing levels at OTPs, how staffing levels have changed over time, and the factors that influence staffing levels. To address this knowledge gap, we assessed the changes in OTP facility characteristics and staffing levels by type of staff for the period 2011 to 2016. In addition, we conducted 16 ordinary least squares regressions, one for each type of staff included in our analysis, to assess how facility characteristics, including number of clients served and the square of the number of clients served, special programs, and service offerings, affect staffing levels (Appendix A). We used latent class analysis to group facilities with common service offerings or programs (see Appendix B). This analysis used data from the 2011 National Survey of Substance Abuse Treatment Services (N-SSATS) supplemental OTP questionnaire and the 2016 N-SSATS survey. We limited the facilities included in our analysis to those that self-identify as federally-certified OTPs and, for consistency in level of care, to facilities that only provide outpatient treatment.

How did OTP staffing change from 2011 to 2016?

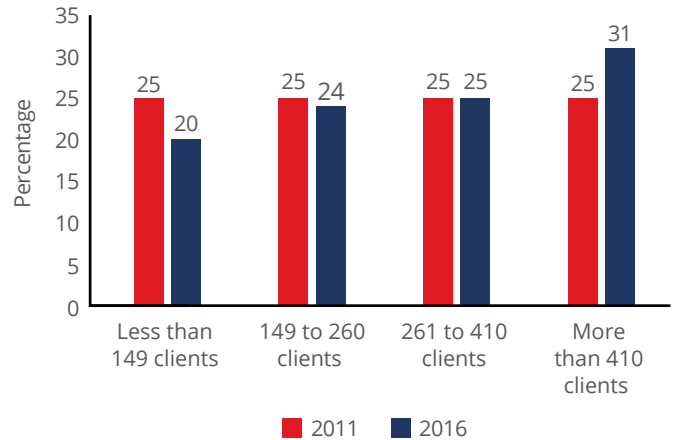
Full-time equivalent (FTE) staff per 1,000 clients increased from 2011 to 2016 for all staff types for which data were available in both years (Table 1).² The most significant increases were for doctoral-level counselors, which increased more than 700 percent (from 0.3 to 2.6 FTEs per 1,000 clients), and pharmacists, which increased 400 percent (from 0.2 to 1.0 FTEs per 1,000 clients). Mid-level medical personnel (defined as physician assistants, nurse practitioners, and advanced practiced registered nurses) and registered nurses also experienced substantial increases in FTEs per 1,000 clients with 138 percent and 76 percent increases, respectively. Overall, medical and counseling staff FTEs per 1,000 clients increased substantially over the five-year period, and the average level of training for medical and counseling staff also increased.

How did characteristics of OTPs change from 2011 to 2016, and how do OTP characteristics relate to staffing levels?

From 2011 to 2016, the average size of OTP facilities as defined by the number of clients being served increased, but these increases were small (Figure 1). In 2016, there was a smaller share of facilities in the less-than-149-clients category (20 percent versus 25 percent) and a larger share of facilities in the more-than-410-clients category (31 percent versus 25 percent).

Our regression analysis had a statistically significant finding of an economy of scale for four of the types of staff we analyzed.³ For these types of staff, Figure 2 shows the increase in FTEs per client resulting from decreasing the number of clients served by a facility from 400 to 200. The effect of facility size on FTEs per client were not significant for other types of staff. From 2011 to 2016, the percentage of OTPs offering programs for special groups such as adolescents, adult men, adult women, seniors, pregnant or postpartum women, and criminal justice

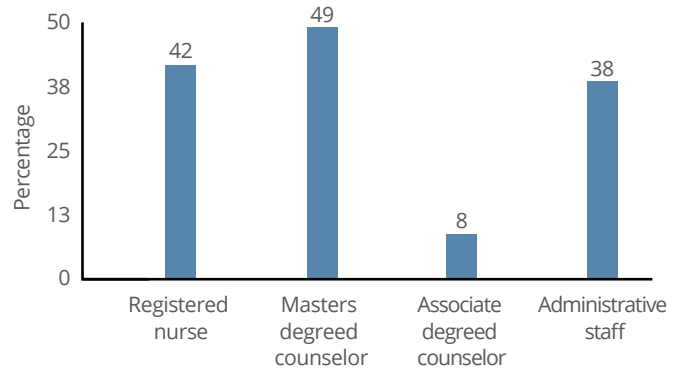
Figure 1. Percentage of facilities in each size category, 2011 and 2016



Source: 2011 and 2016 N-SSATS.

Note: Categories are based on quartiles of the 2011 distribution.

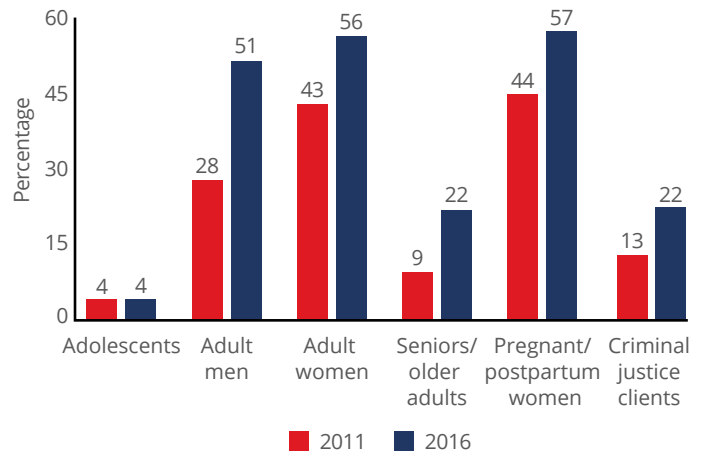
Figure 2. Percentage change in FTEs per client for a 200-client facility relative to a 400-client facility



Source: Based on regression analysis using data from the 2016 N-SSATS.

Note: We calculated percentage change for a given characteristic holding other characteristics constant at the mean for the sample. In 2016 the median facility had 298 clients and a facility at the 75th percentile had 472 clients.

Figure 3. Percentage of facilities providing special programs for population subgroups, 2011 and 2016



Source: 2011 and 2016 N-SSATS.

clients increased (Figure 3). The share of facilities offering programs for seniors more than doubled (from 9 percent to 22 percent). The share offering services to adult men increased by 85 percent (from 28 percent to 51 percent), and the share offering services to criminal justice experienced a similar increase by 72 percent (from 13 percent to 22 percent).

There were few statistically significant differences in staff levels associated with offering special programs for specific groups (Table 2):

- Offering a special program for adolescents was associated with a 78 percent increase in masters degreed counselor FTEs and more than a 300 percent increase in case manager FTEs.
- Offering a special program for criminal justice clients was associated with an 85 percent increase in associate-degreed or non-degreed counselor FTEs.
- Offering a special program for seniors was associated with more than a two-fold increase in peer support staff FTEs.

No statistically significant differences were associated with offering programs for adult men, adult women, and pregnant or postpartum women. We did find, however, that offering childcare services for clients increased other recovery support worker FTEs almost 500 percent and administrative staff FTEs by 54 percent. In 2011 and 2016, about 5 percent of facilities offered childcare services.

Table 2. Percentage change in FTEs associated with offering special programs by staff type

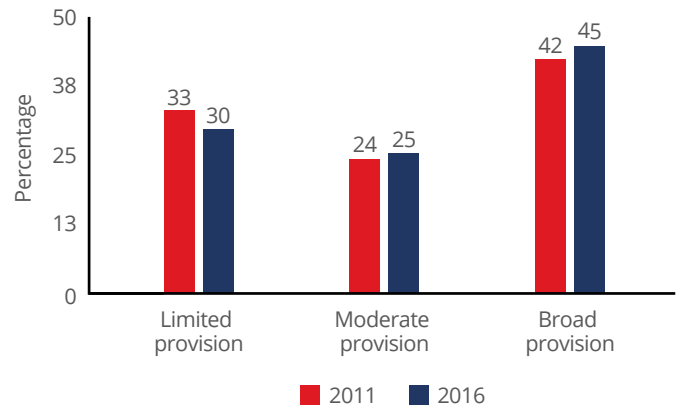
Special program group and type of staff	Percentage change in FTEs
Adolescents	
Masters degreed counselors	78.0
Case management staff	306.5
Criminal justice clients	
Associate degreed or non-degreed counselors	85.0
Seniors	
Peer support staff	235.2
Child care	
Other recovery support staff	491.8
Administrative staff	54.0

Source: Regression analysis using data from the 2016 N-SSATS.

Note: We calculated percentage change for a given characteristic holding other characteristics constant at the mean for the sample.

From 2011 to 2016, the percentage of facilities with limited provision of ancillary services declined slightly, and those with moderate or broad provision increased slightly (Figure 4). Facilities with broad provision had 60 percent more associate degreed or non-degreed FTEs than facilities with moderate provision (data not shown). There were no other statistically significant differences in staff levels between these groups.

Figure 4. Percentage of facilities with limited, moderate, or broad provision of ancillary services, 2011 and 2016

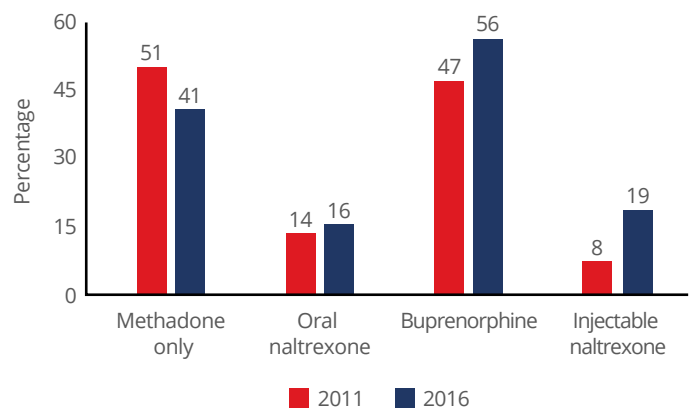


Source: Latent class analysis using data from the 2011 and 2016 N-SSATS (see Appendix B).

Notes: The following ancillary services were included: blood alcohol testing, self-help group, hepatitis education, counseling and support, smoking cessation, tobacco use screening, urine screening, programs for clients who have experienced sexual abuse, programs for clients who have experienced intimate partner violence and domestic violence, testing for sexually transmitted diseases, tuberculosis testing, after/continuing care, assistance obtaining social services, discharge planning, employment counseling, housing assistance, case management, transportation assistance, screening for hepatitis B and C, screening for mental health disorders, outreach to people in the community, interim services if no space is available at facility, social skills training, mentoring/peer support, and health education for illnesses other than HIV and hepatitis.

The types of medication offered at OTPs changed from 2011 to 2016. Fewer facilities offered methadone only in 2016, and a higher share offered buprenorphine and injectable naltrexone (Figure 5).

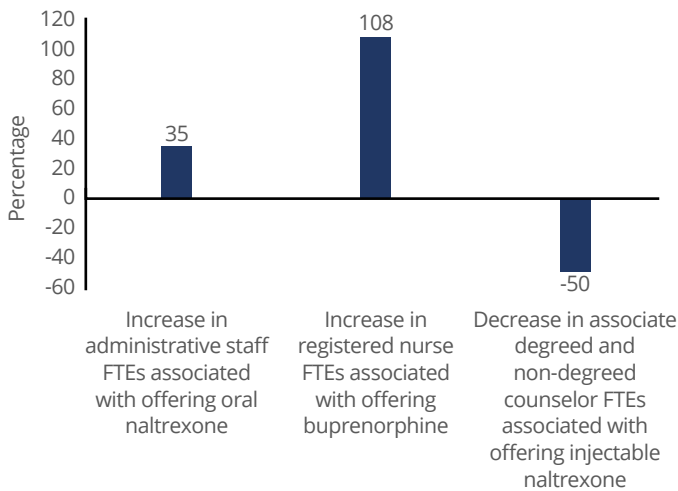
Figure 5. Percentage of facilities providing methadone only, oral naltrexone, buprenorphine and injectable naltrexone, 2011 and 2016



Source: 2011 and 2016 N-SSATS.

The regression results indicate that offering specific medications was associated with different levels of FTEs for some types of staff (Figure 6). Offering oral naltrexone was associated with a 35 percent increase in administrative staff FTEs. Offering buprenorphine was associated with a 108 percent increase in registered nursing staff FTEs, and offering injectable naltrexone was associated with a 50 percent decrease in associate degree or non-degreed counseling FTEs.

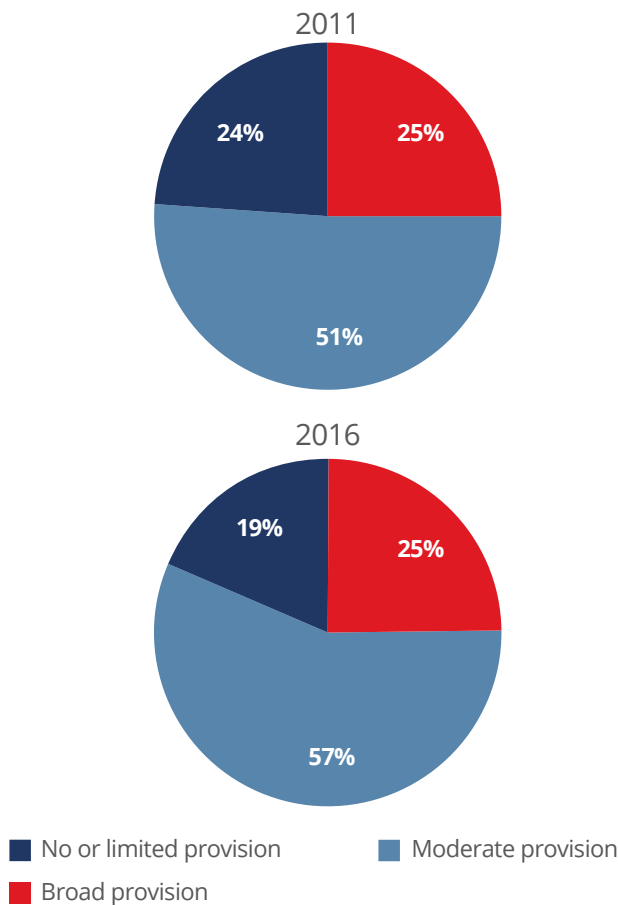
Figure 6. Percentage change in FTEs for select staff types associated with offering specific medications



Source: Regression analysis using data from the 2016 N-SSATS.

Note: We calculated percentage change for a given characteristic holding other characteristics constant at the mean for the sample.

Figure 7. Percentage of facilities providing a low, moderate, or broad range of mental health services, 2011 and 2016



Source: Latent class analysis using data from the 2011 and 2016 N-SSATS (see Appendix B).

From 2011 to 2016, the percentage of facilities offering no or very limited mental health services declined (from 24 percent to 19 percent; Figure 7), and the share offering moderate provision of these services increased by 12 percent (from 51 percent to 57 percent). The share of facilities that offered a broad range of mental health services remained relatively unchanged. We found no statistically significant differences in staffing levels by type of staff for facilities with no or limited provision of mental health services relative to those with moderate provision. Facilities that offered a broad provision of mental health services, however, had 79 percent more physician FTEs than facilities with moderate provision. We found no statistically significant differences for other types of staff.

Discussion

Over the five-year period from 2011 to 2016, FTEs per client substantially increased across all types of staff. In the same period, facility characteristics changed moderately: there was a small increase in the average number of clients served at a facility, facilities became more likely to provide programs for specific groups, and more facilities offered a broader set of ancillary services, medications, and mental health services. These findings suggest improvement over the five-year period in the intensity and range of services OTP clients received.

For most of the facility characteristics analyzed here, we found no statistically significant associations with staffing levels for most types of staff. This finding might indicate that the particular facility characteristic does not affect staffing levels for the given staff type. Yet it might also result from imprecision in our measures. Most of the measures we assessed indicated whether facilities offered services. The measures did not provide information on the proportion of clients using the service or the intensity with which the facility provided the service to each client. Variation across facilities in these features of service provision might obscure the connections to staffing levels. In addition, the identified associations between facility characteristics and staff levels might not be causal because the observed facility characteristics could be correlated with unobserved factors that might drive the differences in staffing levels.

Endnotes

- 1 "Federal Opioid Treatment Standards." *Code of Federal Regulations*, title 42 (2002): 8.12. <http://www.gpo.gov/fdsys/pkg/CFR-2002-title42-vol1/pdf/CFR-2002-title42-vol1-sec8-12.pdf>.
- 2 Facilities reported total number of paid hours worked in a week for each staff type. We divided the hours by 40 to calculate FTEs. Weekly hours worked in the 2011 survey were for a typical week and, in the 2016 survey, were for the week of March 27 to April 2, 2016. We divided the FTEs by the total number of clients in care and multiplied by 1,000 to calculate FTEs per 1,000 clients.
- 3 We use the phrase "statistically significant" to refer to statistical significance at the 99 percent confidence level and limit the findings included in this brief to those that meet this threshold. We did not adjust standard errors for multiple testing.

Appendix A: Regression Results

Below are the estimates and standard errors for the regression models used to estimate the percent change in FTEs associated with facility characteristics by profession (Appendix Table A.1-A.4).

Appendix Table A.1. FTEs regression results, medical staff

	<i>Physician</i>		<i>Registered nurse</i>		<i>Licensed practical nurse</i>		<i>Midlevel provider</i>		<i>Pharmacist</i>	
	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>
Intercept	0.446	0.367	0.559	0.183	0.815	0.107	-0.075	0.758	0.110	0.200
Number of clients	0.001	0.066	0.002	<.0001	0.004	<.0001	0.001	0.002	0.000	0.068
Number of clients squared	0.000	0.344	0.000	<.0001	0.000	0.304	0.000	0.843	0.000	0.276
Facility is not a hospital nor is it located in or operated by a hospital	-0.080	0.704	-1.193	<.0001	1.142	<.0001	-0.285	0.006	-0.065	0.074
Offers or does not offer program targeting specific populations										
Does not offer program for adolescents	0.364	0.142	0.080	0.704	0.394	0.120	-0.046	0.704	0.035	0.413
Offers program for adult men	-0.022	0.909	0.011	0.946	0.124	0.525	0.088	0.349	0.035	0.287
Has program for adult women	-0.007	0.969	0.064	0.692	-0.130	0.502	0.044	0.639	-0.007	0.832
Has program for pregnant/postpartum women	-0.109	0.326	-0.125	0.181	0.005	0.965	-0.097	0.074	-0.023	0.241
Does not offer program for seniors or older adults	-0.363	0.031	0.305	0.033	-0.253	0.142	0.021	0.803	0.027	0.360
Does not offer a program for criminal justice clients	-0.310	0.047	-0.228	0.085	0.389	0.015	0.110	0.151	-0.015	0.587
Does not offer a program for clients who have experienced trauma	-0.009	0.959	0.183	0.231	-0.471	0.011	0.055	0.534	-0.035	0.260
Does not have program for clients who have experienced sexual abuse	-0.105	0.653	0.035	0.859	-0.044	0.855	0.061	0.595	0.032	0.429
Does not have program for clients who have experienced intimate partner violence, domestic violence	0.345	0.120	-0.316	0.094	0.223	0.327	0.017	0.873	0.005	0.900
Does not provide services for domestic violence	-0.164	0.137	0.045	0.633	0.168	0.138	0.018	0.734	0.009	0.633
Does not offer childcare	0.061	0.787	0.388	0.044	-0.473	0.042	0.196	0.079	-0.005	0.892
Medications offered										
Does not offer oral naltrexone	-0.233	0.162	0.021	0.884	-0.066	0.697	0.023	0.778	0.014	0.630
Offers buprenorphine	0.475	0.101	0.669	0.007	0.097	0.744	0.155	0.276	-0.009	0.865
Does not offer injectable naltrexone	0.174	0.268	0.051	0.701	-0.326	0.042	-0.040	0.604	0.028	0.303
Does not offer only methadone	-0.276	0.358	-0.592	0.021	-0.193	0.531	-0.100	0.500	0.000	1.000
Range of ancillary substance abuse treatment services (reference group=broad provision)										
Limited provision of testing and support services	-0.025	0.854	-0.012	0.921	-0.075	0.595	0.039	0.563	-0.005	0.823
Limited provision of testing; broad provision of support services	-0.055	0.662	-0.136	0.207	0.131	0.313	-0.159	0.011	0.020	0.366

	<i>Physician</i>		<i>Registered nurse</i>		<i>Licensed practical nurse</i>		<i>Midlevel provider</i>		<i>Pharmacist</i>	
	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>
Range of services for individuals with HIV/AIDS (reference group=no programs, broad provision)										
No programs, limited provision of services	-0.067	0.582	-0.076	0.467	0.135	0.282	-0.070	0.246	0.008	0.707
Has programs, broad provision of services	0.003	0.987	0.204	0.142	-0.037	0.824	0.239	0.003	0.013	0.636
Has programs, limited provision of services	-0.237	0.388	-0.155	0.506	-0.012	0.965	0.202	0.133	-0.009	0.859
Range of mental health services offered (reference group=moderate provision)										
Broad provision of mental health services	0.448	0.001	0.033	0.777	-0.089	0.530	0.115	0.091	-0.004	0.872
No or limited provision of mental health services	-0.074	0.569	0.012	0.915	-0.270	0.043	0.111	0.082	-0.014	0.542
Ownership (reference group=private for-profit)										
Private not-for-profit	-0.069	0.589	0.513	<.0001	-0.089	0.497	0.013	0.834	-0.012	0.601
State government	-0.058	0.906	0.177	0.670	0.709	0.157	-0.130	0.590	-0.030	0.726
Local government	0.235	0.420	1.973	<.0001	-0.146	0.624	-0.188	0.190	0.004	0.933
Tribal government	-0.471	0.595	0.081	0.914	-0.103	0.910	0.972	0.026	-0.034	0.825
Department of veterans affairs	-0.258	0.695	-0.706	0.207	-0.361	0.593	0.172	0.595	0.973	<.0001
Census region (reference group=South Atlantic)										
Pacific	0.461	0.004	-0.140	0.296	-1.065	<.0001	0.277	0.000	-0.166	<.0001
New England	-0.045	0.812	0.739	<.0001	-0.985	<.0001	-0.019	0.835	-0.120	0.000
Middle Atlantic	0.169	0.304	0.457	0.001	-0.552	0.001	0.161	0.047	-0.144	<.0001
East North Central	0.318	0.075	0.289	0.056	-0.826	<.0001	0.008	0.928	-0.155	<.0001
West North Central	0.094	0.714	-0.116	0.596	-0.411	0.118	0.210	0.096	0.042	0.346
East South Central	0.008	0.977	0.035	0.882	-0.169	0.548	0.061	0.651	0.070	0.142
West South Central	0.156	0.430	-0.181	0.280	-0.518	0.010	0.059	0.540	-0.047	0.171
Mountain	0.014	0.946	0.205	0.257	-1.092	<.0001	0.188	0.072	-0.037	0.318
Urbanicity (reference group= large central metropolitan area)										
Large fringe metropolitan area	-0.019	0.891	0.104	0.375	-0.728	<.0001	-0.172	0.011	-0.001	0.959
Medium metropolitan area	-0.101	0.437	0.072	0.513	-0.290	0.029	-0.027	0.677	0.054	0.017
Small metropolitan area	-0.101	0.549	0.189	0.186	-0.419	0.015	-0.128	0.123	0.013	0.670
Micropolitan area	-0.030	0.882	0.029	0.864	-0.393	0.056	-0.155	0.117	0.017	0.628
Noncore	0.046	0.898	0.026	0.933	-0.035	0.925	-0.138	0.435	-0.027	0.667

Appendix Table A.2. FTEs regression results, counseling staff

	<i>Doctoral degreed</i>		<i>Masters degreed</i>		<i>Bachelors degreed</i>		<i>Associate or non-degreed</i>	
	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>
Intercept	0.316	0.090	5.123	<.0001	1.754	0.113	-0.021	0.978
Number of clients	0.000	0.222	0.003	0.002	0.007	<.0001	0.006	<.0001
Number of clients squared	0.000	0.917	0.000	0.007	0.000	0.655	0.000	<.0001
Facility is not a hospital nor is it located in or operated by a hospital	-0.056	0.476	0.253	0.588	-0.117	0.803	0.383	0.232
Offers or does not offer program targeting specific populations								
Does not offer program for adolescents	0.012	0.899	-2.145	0.000	-0.692	0.211	0.350	0.353
Offers program for adult men	0.002	0.982	-0.658	0.121	-0.083	0.845	-0.400	0.168
Has program for adult women	0.010	0.887	0.949	0.025	0.023	0.957	0.208	0.472
Has program for pregnant/postpartum women	-0.084	0.045	0.269	0.274	0.220	0.373	-0.381	0.024
Does not offer program for seniors or older adults	-0.103	0.102	-0.059	0.874	0.378	0.315	-0.111	0.665
Does not offer a program for criminal justice clients	0.034	0.562	0.425	0.220	-0.269	0.440	-1.262	<.0001
Does not offer a program for clients who have experienced trauma	-0.064	0.343	-0.664	0.097	-0.100	0.803	0.011	0.967
Does not have program for clients who have experienced sexual abuse	0.044	0.616	-0.926	0.075	-1.204	0.021	0.800	0.025
Does not have program for clients who have experienced intimate partner violence, domestic violence	0.017	0.837	0.876	0.077	1.462	0.003	-0.043	0.898
Does not provide services for domestic violence	-0.029	0.482	-0.022	0.928	0.594	0.016	-0.138	0.412
Does not offer childcare	-0.057	0.501	-0.972	0.055	-0.679	0.181	-0.238	0.492
Medications offered								
Does not offer oral naltrexone	-0.147	0.019	-0.775	0.037	-0.215	0.564	-0.267	0.294
Offers buprenorphine	-0.111	0.308	0.444	0.490	0.826	0.201	-0.408	0.355
Does not offer injectable naltrexone	0.101	0.086	-0.125	0.720	-0.493	0.159	0.970	<.0001
Does not offer only methadone	0.125	0.268	-0.600	0.371	-0.890	0.186	0.262	0.567
Range of ancillary substance abuse treatment services (reference group=broad provision)								
Limited provision of testing and support services	-0.025	0.629	0.178	0.559	-0.179	0.558	-0.493	0.018
Limited provision of testing; broad provision of support services	-0.010	0.839	0.042	0.882	0.693	0.015	-0.734	0.000
Range of services for individuals with HIV/AIDS (reference group=no programs, broad provision)								
No programs, limited provision of services	-0.010	0.826	0.032	0.906	-0.080	0.769	0.135	0.470
Has programs, broad provision of services	0.040	0.510	-0.290	0.424	-0.114	0.755	-0.098	0.692
Has programs, limited provision of services	0.066	0.523	-0.492	0.421	-0.471	0.443	-0.431	0.303
Range of mental health services offered (reference group=moderate provision)								
Broad provision of mental health services	0.054	0.294	0.398	0.196	0.073	0.814	0.300	0.154
No or limited provision of mental health services	-0.028	0.564	-0.573	0.048	-0.106	0.715	0.280	0.158

	<i>Doctoral degreed</i>		<i>Masters degreed</i>		<i>Bachelors degreed</i>		<i>Associate or non-degreed</i>	
	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>
Ownership (reference group=private for-profit)								
Private not-for-profit	0.026	0.585	0.770	0.007	-0.504	0.079	-0.140	0.475
State government	0.107	0.560	0.613	0.574	-0.481	0.661	0.053	0.944
Local government	-0.020	0.855	2.082	0.001	-0.352	0.589	-0.326	0.462
Tribal government	-0.236	0.478	-1.838	0.351	-2.482	0.210	4.925	0.000
Department of veterans affairs	0.331	0.181	0.654	0.656	-0.277	0.851	-0.549	0.585
Census region (reference group=South Atlantic)								
Pacific	0.127	0.032	-1.400	<.0001	-0.548	0.119	2.283	<.0001
New England	-0.130	0.069	0.261	0.537	-1.295	0.002	-0.742	0.010
Middle Atlantic	-0.076	0.220	0.067	0.854	0.908	0.014	-0.292	0.244
East North Central	-0.025	0.712	0.023	0.953	0.371	0.351	0.123	0.649
West North Central	-0.044	0.649	-0.718	0.210	0.941	0.102	-0.045	0.909
East South Central	-0.064	0.536	1.630	0.008	-0.151	0.806	-1.441	0.001
West South Central	-0.077	0.299	-0.726	0.098	-0.101	0.818	0.249	0.407
Mountain	0.050	0.535	-0.725	0.127	-1.404	0.003	-0.088	0.787
Urbanicity (reference group= large central metropolitan area)								
Large fringe metropolitan area	-0.028	0.585	-0.028	0.927	0.330	0.284	-0.179	0.394
Medium metropolitan area	0.001	0.981	0.469	0.104	0.255	0.378	-0.158	0.423
Small metropolitan area	0.032	0.610	-0.321	0.392	0.519	0.169	-0.284	0.269
Micropolitan area	0.143	0.058	-0.829	0.064	0.555	0.217	-0.145	0.636
Noncore	-0.037	0.783	-1.053	0.189	0.656	0.415	0.228	0.677

Appendix Table A.3. FTEs regression results, support staff

	<i>Pharmacy assistant</i>		<i>Case manager</i>		<i>Peer support</i>		<i>Other recovery support</i>	
	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>
Intercept	0.065	0.504	0.502	0.023	0.240	0.233	0.573	0.008
Number of clients	0.000	0.001	0.000	0.414	0.000	0.011	0.000	0.307
Number of clients squared	0.000	0.041	0.000	0.193	0.000	0.088	0.000	0.125
Facility is not a hospital nor is it located in or operated by a hospital	-0.021	0.608	0.216	0.021	0.089	0.299	-0.004	0.962
Offers or does not offer program targeting specific populations								
Does not offer program for adolescents	0.004	0.934	-0.419	0.000	-0.240	0.017	0.128	0.237
Offers program for adult men	-0.057	0.125	-0.086	0.312	-0.031	0.693	-0.017	0.838
Has program for adult women	0.048	0.193	0.154	0.069	0.086	0.267	-0.043	0.605
Has program for pregnant/postpartum women	-0.001	0.966	-0.087	0.079	0.029	0.526	0.043	0.373

	<i>Pharmacy assistant</i>		<i>Case manager</i>		<i>Peer support</i>		<i>Other recovery support</i>	
	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>
Does not offer program for seniors or older adults	-0.016	0.625	-0.100	0.182	-0.195	0.005	0.044	0.553
Does not offer a program for criminal justice clients	-0.029	0.339	-0.124	0.077	0.043	0.497	-0.089	0.190
Does not offer a program for clients who have experienced trauma	-0.004	0.919	0.105	0.192	-0.048	0.508	-0.054	0.492
Does not have program for clients who have experienced sexual abuse	-0.015	0.741	-0.039	0.708	-0.092	0.334	-0.063	0.534
Does not have program for clients who have experienced intimate partner violence, domestic violence	0.005	0.905	0.007	0.942	0.128	0.157	0.036	0.713
Does not provide services for domestic violence	0.012	0.579	0.046	0.353	0.006	0.892	-0.025	0.608
Does not offer childcare	-0.008	0.851	0.105	0.300	-0.046	0.620	-0.517	<.0001
Medications offered								
Does not offer oral naltrexone	0.019	0.550	-0.059	0.430	-0.032	0.638	-0.153	0.035
Offers buprenorphine	-0.034	0.552	0.155	0.230	0.068	0.563	-0.059	0.639
Does not offer injectable naltrexone	-0.007	0.824	-0.008	0.905	0.092	0.151	0.127	0.063
Does not offer only methadone	0.010	0.870	-0.210	0.119	-0.055	0.651	0.028	0.833
Range of ancillary substance abuse treatment services (reference group=broad provision)								
Limited provision of testing and support services	-0.034	0.206	-0.050	0.411	0.013	0.816	0.036	0.548
Limited provision of testing; broad provision of support services	0.005	0.855	-0.052	0.362	-0.058	0.259	-0.034	0.536
Range of services for individuals with HIV/AIDS (reference group=no programs, broad provision)								
No programs, limited provision of services	0.000	0.986	-0.053	0.337	0.086	0.084	-0.010	0.858
Has programs, broad provision of services	-0.028	0.381	-0.044	0.548	-0.126	0.057	0.068	0.344
Has programs, limited provision of services	-0.005	0.929	-0.147	0.231	-0.143	0.201	-0.127	0.288
Range of mental health services offered (reference group=moderate provision)								
Broad provision of mental health services	-0.019	0.492	0.078	0.206	0.072	0.202	0.038	0.531
No or limited provision of mental health services	0.019	0.463	0.045	0.435	-0.039	0.462	-0.045	0.431
Ownership (reference group=private for-profit)								
Private not-for-profit	-0.034	0.180	0.101	0.079	0.125	0.017	-0.050	0.371
State government	-0.046	0.632	-0.081	0.713	-0.090	0.651	-0.058	0.786
Local government	-0.028	0.622	0.164	0.208	0.211	0.076	0.207	0.104
Tribal government	-0.109	0.530	-0.208	0.600	-0.159	0.659	-0.320	0.408
Department of veterans affairs	0.001	0.994	-0.033	0.910	0.330	0.218	0.040	0.890
Census region (reference group=South Atlantic)								
Pacific	-0.026	0.394	-0.108	0.124	-0.084	0.191	0.010	0.887
New England	-0.071	0.054	0.214	0.012	-0.197	0.011	0.057	0.493
Middle Atlantic	-0.059	0.066	-0.179	0.015	-0.092	0.168	-0.045	0.530

	<i>Pharmacy assistant</i>		<i>Case manager</i>		<i>Peer support</i>		<i>Other recovery support</i>	
	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>
East North Central	-0.055	0.115	-0.104	0.192	-0.016	0.824	0.036	0.647
West North Central	0.038	0.445	-0.183	0.112	0.176	0.093	-0.030	0.790
East South Central	0.051	0.339	-0.108	0.379	-0.131	0.243	0.141	0.241
West South Central	0.038	0.324	-0.051	0.566	0.000	1.000	-0.026	0.761
Mountain	-0.002	0.952	-0.076	0.424	-0.065	0.456	0.053	0.567
Urbanicity (reference group= large central metropolitan area)								
Large fringe metropolitan area	0.005	0.843	-0.170	0.006	-0.096	0.087	-0.035	0.564
Medium metropolitan area	0.024	0.339	-0.063	0.279	0.034	0.517	-0.010	0.866
Small metropolitan area	0.037	0.257	-0.061	0.417	-0.003	0.960	0.055	0.455
Micropolitan area	0.081	0.039	-0.107	0.236	-0.021	0.799	0.041	0.640
Noncore	0.063	0.367	-0.102	0.527	-0.047	0.747	-0.072	0.649

Appendix Table A.4. FTEs regression results, support staff (continued)

	<i>Administrative staff</i>		<i>Other staff</i>		<i>Other clinical staff</i>	
	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>
Intercept	3.186	<.0001	0.530	0.006	-0.146	0.187
Number of clients	0.005	<.0001	0.000	0.044	0.000	0.072
Number of clients squared	0.000	0.000	0.000	0.606	0.000	0.354
Facility is not a hospital nor is it located in or operated by a hospital	0.365	0.216	-0.290	0.000	0.125	0.008
Offers or does not offer program targeting specific populations						
Does not offer program for adolescents	-0.625	0.073	-0.039	0.691	0.049	0.374
Offers program for adult men	-0.305	0.255	-0.108	0.150	0.006	0.881
Has program for adult women	0.617	0.021	0.173	0.020	-0.015	0.727
Has program for pregnant/postpartum women	-0.349	0.025	-0.098	0.024	-0.031	0.205
Does not offer program for seniors or older adults	0.110	0.642	-0.195	0.003	-0.036	0.342
Does not offer a program for criminal justice clients	-0.454	0.039	-0.065	0.286	-0.030	0.392
Does not offer a program for clients who have experienced trauma	-0.101	0.691	-0.006	0.934	0.028	0.483
Does not have program for clients who have experienced sexual abuse	-0.280	0.393	0.096	0.296	0.040	0.440
Does not have program for clients who have experienced intimate partner violence, domestic violence	0.134	0.667	-0.038	0.663	-0.009	0.849
Does not provide services for domestic violence	0.178	0.251	-0.075	0.082	0.013	0.599
Does not offer childcare	-1.244	0.000	0.145	0.104	0.070	0.169
Medications offered						
Does not offer oral naltrexone	-0.781	0.001	-0.036	0.578	-0.013	0.722
Offers buprenorphine	0.371	0.362	0.119	0.294	0.015	0.821

	<i>Administrative staff</i>		<i>Other staff</i>		<i>Other clinical staff</i>	
	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>	<i>Estimate</i>	<i>P-value</i>
Does not offer injectable naltrexone	0.182	0.408	-0.034	0.576	-0.017	0.628
Does not offer only methadone	-0.374	0.377	-0.142	0.230	-0.027	0.687
Range of ancillary substance abuse treatment services (reference group=broad provision)						
Limited provision of testing and support services	0.069	0.722	-0.038	0.478	-0.004	0.905
Limited provision of testing; broad provision of support services	-0.144	0.418	-0.025	0.610	-0.009	0.744
Range of services for individuals with HIV/AIDS (reference group=no programs, broad provision)						
No programs, limited provision of services	0.013	0.939	0.065	0.177	0.011	0.674
Has programs, broad provision of services	-0.349	0.129	-0.086	0.181	0.000	0.995
Has programs, limited provision of services	-0.256	0.508	-0.078	0.470	-0.011	0.864
Range of mental health services offered (reference group=moderate provision)						
Broad provision of mental health services	0.226	0.244	0.182	0.001	-0.009	0.770
No or limited provision of mental health services	-0.247	0.176	-0.017	0.742	-0.036	0.211
Ownership (reference group=private for-profit)						
Private not-for-profit	0.728	<.0001	0.014	0.784	-0.015	0.601
State government	-0.086	0.900	0.144	0.454	-0.067	0.539
Local government	1.473	0.000	0.343	0.003	-0.021	0.751
Tribal government	5.089	<.0001	-0.019	0.957	0.653	0.001
Department of veterans affairs	-1.204	0.194	-0.451	0.082	0.029	0.846
Census region (reference group=South Atlantic)						
Pacific	0.299	0.178	0.011	0.853	-0.025	0.472
New England	-0.660	0.014	0.006	0.940	-0.013	0.766
Middle Atlantic	-0.212	0.361	-0.030	0.641	0.093	0.012
East North Central	0.209	0.403	-0.034	0.626	-0.017	0.670
West North Central	0.006	0.987	-0.017	0.866	0.003	0.961
East South Central	-0.103	0.789	-0.129	0.231	0.033	0.586
West South Central	-0.323	0.244	0.075	0.330	-0.044	0.315
Mountain	-0.161	0.593	-0.007	0.937	-0.028	0.552
Urbanicity (reference group= large central metropolitan area)						
Large fringe metropolitan area	-0.333	0.087	-0.118	0.030	-0.011	0.717
Medium metropolitan area	-0.165	0.365	0.018	0.716	0.027	0.359
Small metropolitan area	-0.137	0.565	-0.074	0.265	0.009	0.814
Micropolitan area	-0.429	0.129	-0.112	0.156	-0.015	0.739
Noncore	-0.178	0.725	-0.092	0.515	-0.064	0.427

Appendix B: Latent Class Analysis

This study uses latent class analysis (LCA) to group facilities with common service offerings or programs. The LCA methodology is a type of structural equation modeling that identifies the number and nature of unobserved subgroups, or latent classes, by assessing the model fit statistics and interpretability of the extracted classes. It models the probability, P , of the latent class membership, c , given observed pattern of answers on a set of categorical variables, y , for each unit of analysis:

$$P(L=c|Y=y)$$

This probabilistic approach enables us to find the most likely latent class memberships for each National Survey of Substance Abuse Treatment Services (N-SSATS) facility in our sample based on the facility's characteristics. The characteristics were defined by a set of dichotomous survey responses, each of which indicated whether a facility provided or did not provide a certain type of service or program. The different latent class memberships could help explain the different types of facilities because each class membership would represent a distinct, class-specific response profile.

We estimate LCA models for facilities operating in 2011 and 2016 that are OTPs and only provide outpatient services. We observed that there were services and programs specific to (1) people with HIV/AIDS or identifying as LGBTQ, (2) people with mental health disorders, and (3) none of the aforementioned groups but rather generic services. Because of the distinct nature of these services and programs, we decided to develop classes separately rather than use a single model.

HIV/AIDS-related services and programs

For HIV/AIDS-related services and programs, the model with four latent classes provides the most meaningful interpretations of the classes. We labeled these groups as follows: (1) facilities offering no programs but a broad provision of services, (2) those offering programs but limited provision of services, (3) those offering programs and a broad provision of services, and (4) those offering no programs and limited provision of services.

The four class model also achieved high probabilities of correct class membership assignments and overall summary measures of classification quality or *Entropy* coefficient. *Entropy* ranges from 0 to 1, and values approaching 1 indicate clear delineation of classes (Celeux and Soromenho 1996). Values above 0.8, which correspond to 80 percent correct classification, are considered adequate (Clark and Muthén 2009; Muthén and Muthén 2007). We observed an *Entropy* value above 0.8, suggesting a reliable classification model (Table 1).

Table 1. Entropy summary, HIV/AIDS model

	OTP
Entropy	0.832

Table 2 provides the average latent class assignment probabilities for the facilities assigned to each of the four predicted latent classes. Values closer to 1.0 on the diagonal of the matrix indicate that facilities are classified into their appropriate latent classes with high certainties on average.

Table 3 shows the average probabilities that a service or program is offered by a facility in the respective latent class. For example, we see that there is an 83 percent chance that an OTP facility in latent class 1 provides HIV testing services.

Table 2. OTP: Average latent class probabilities for most likely latent class membership (row) by latent class (column), HIV/AIDS model

	Class 1	Class 2	Class 3	Class 4
Class 1	0.852	0	0.001	0.146
Class 2	0	0.859	0.141	0
Class 3	0	0.03	0.97	0
Class 4	0.066	0.001	0	0.933

Table 3. OTP: Probability of offering service by latent class, HIV/AIDS model

	Class 1 (N=945)	Class 2 (N=83)	Class 3 (N=424)	Class 4 (N=720)
HIV testing	0.8339	0.1687	0.8892	0.09736
HIV/AIDS education, counseling, and support	1	0.4699	1	0.5722
Special program for HIV or AIDS	0	1	1	0
Special program for LGBT clients	0.03188	0.6506	0.4214	0.03226
Early intervention for HIV	0.6999	0.01205	0.7972	0.02643

Mental health-related services and programs

The model with three latent classes provides the most meaningful interpretations of the classes for mental health services and programs. Table 4 shows the model's *Entropy* value. OTP facilities are categorized into three groups: (1) facilities with a broad provision of services, (2) those with no or limited provision, and (3) those with a moderate provision of clinical and therapeutic services.

Table 4. Entropy summary, mental health model

	OTP
Entropy	0.811

Table 5. OTP: Average latent class probabilities for most likely latent class membership (row) by latent class (column), mental health model

	Class 1	Class 2	Class 3
Class 1	0.968	0.009	0.023
Class 2	0.006	0.88	0.113
Class 3	0.027	0.065	0.908

Table 6. OTP: Probability of offering service by latent class, mental health model

	Class 1 (N=546)	Class 2 (N=445)	Class 3 (N=1181)
Sometimes, often, or always uses anger management	0.8393	0.2162	0.8379
Sometimes, often, or always uses brief intervention	0.8324	0.5011	0.8938
Sometimes, often, or always uses cognitive behavior therapy	0.9721	0.5828	0.9815
Sometimes, often, or always uses community reinforcement plus vouchers	0.1594	0.02257	0.1296
Sometimes, often, or always uses contingency management/motivational incentives	0.6561	0.3806	0.7603
Focused on MH	0.009158	0	0
Focused on other or general health	0.01099	0.01573	0
Focused on SA	0.7198	0.9843	1
Focused on both MH and SA	0.2601	0	0
Sometimes, often or always uses matrix model	0.3916	0.06834	0.4364
No clients are offered MH treatment	0	0.6117	0.3704
Sometimes, often, or always uses motivational interviewing	0.9814	0.6372	0.9816
Sometimes, often, or always uses rational emotive behavioral therapy	0.4364	0.1131	0.4768
Sometimes, often, or always uses relapse prevention	0.9852	0.8781	0.9826
Sometimes, often, or always uses SA counseling	0.9926	0.9685	0.9923
Offers MH services	0.9725	0.1056	0.1685
Provides comprehensive MH assessment or diagnosis	0.7784	0.05869	0.02629
Program for clients with co-occurring MH/SA	0.5712	0.1197	0.3151
Medications for psychiatric disorders	0.7656	0.02247	0.02971
Sometimes, often, or always uses trauma-related counseling	0.8202	0.1481	0.7281
Sometimes, often, or always uses 12-step facilitation	0.6942	0.4376	0.7606

Table 5 shows the average latent class assignment probabilities for the facilities assigned to each of the predicted latent classes. Table 6 shows the average probabilities that the latent classes offer a service or program.

Generic services and programs

For generic services and programs, the model with three latent classes provides the most meaningful interpretations of the classes and achieves high probabilities of correct class membership assignments as well as *Entropy* as shown Table 7.

The OTP facilities can be classified into (1) facilities with a limited provision of testing and support services; (2) those with limited provision of screening, testing, and health education and a broader provision of outreach, peer support, and support developing social skills and connecting with housing and social services; or (3) those with a broad provision of screening and testing and a broader provision of interim services, transportation, and programs for sexual abuse.

Table 7. Entropy summary, generic model

	OTP
Entropy	0.851

The average latent class assignment probabilities and the average probabilities that each latent class offers a service or program are presented here in a similar way.

Table 8. OTP: Average latent class probabilities for most likely latent class membership (row) by latent class (column), generic model

	Class 1	Class 2	Class 3
Class 1	0.927	0.046	0.027
Class 2	0.05	0.918	0.032
Class 3	0.03	0.021	0.948

Table 9. OTP: Probability of offering service by latent class, generic model

	<i>Class 1 (N=681)</i>	<i>Class 2 (N=533)</i>	<i>Class 3 (N=958)</i>
Blood alcohol testing	0.6461	0.8161	0.8483
Self-help group	0.1909	0.4972	0.4875
Hepatitis education, counseling, and support	0.6055	0.8333	0.9679
Smoking cessation	0.1904	0.357	0.6311
Screen tobacco	0.4476	0.4398	0.7816
Urine Screen	0.9941	0.9775	0.9958
Special program for clients who had experienced sexual abuse (2016 only)	0.06402	0.2308	0.303
Special program for clients who had experienced intimate partner violence and domestic violence (2016 only)	0.06707	0.2657	0.2784
Sexually transmitted disease testing	0.4515	0.3696	0.8182
Tuberculosis screen	0.9325	0.9193	0.9906
After/continuing care	0.6608	0.8255	0.8413
Assistance obtaining social services	0.2702	0.8571	0.8299
Discharge planning	0.9706	0.9925	0.9958
Employment counseling	0.0837	0.666	0.6405
Housing assistance	0.2265	0.8386	0.7505
Case management	0.7518	0.9644	0.9259
Transportation assistance	0.06902	0.2669	0.4071
Screening for hepatitis B	0.3735	0.03571	0.9362
Screening for hepatitis C	0.4405	0.1407	0.9979
Screen for MH	0.2445	0.4353	0.6911
Outreach to comm	0.3221	0.7989	0.7129
Interim services when no space available	0.09853	0.3021	0.3657
Social skills	0.3847	0.9231	0.8715
Mentoring/peer support	0.1235	0.621	0.5313
Health education not for HIV, hepatitis	0.4324	0.8462	0.9311

Endnotes

- 1 Celeux, G., and G. Soromenho. "An Entropy Criterion for Assessing the Number of Clusters in a Mixture Model." *Journal of Classification*, vol. 13, 1996, pp. 195–212.
- 2 Clark, S.L., and B. Muthén. "Relating Latent Class Analysis Results to Variables Not Included in the Analysis." 2019. Available at <https://www.statmodel.com/download/relatinglca.pdf>. Accessed August 30, 2019.
- 3 Muthén, L.K., and B.O. Muthén. "Re: What Is a Good Value of Entropy" [Online comment]. 2007. Available at <http://www.statmodel.com/discussion/messages/13/2562.html?1237580237>.